REMARKS

This application has been carefully reviewed in light of the Office Action dated July 20, 2004. Claims 13 and 42 have been amended. Applicants reserve the right to pursue the original claims and other claims in this and other applications. Please reconsider the above-referenced application in light of the foregoing amendments and following remarks.

Claim 13 has been amended to recite a method of "depositing a dielectric film . . . subjecting the dielectric film to a densifying treatment to stabilize said film by heating the semiconductor substrate; and subjecting said stabilized dielectric film to a wet oxidation with steam process in a rapid thermal process chamber . . . by heating a mixture of hydrogen and oxygen gases at a temperature greater than about 450 °C, wherein the ratio of hydrogen to oxygen gases is in the range from 0.1 to about 0.8 and the pressure of said rapid thermal process chamber is held at about atmospheric pressure." Support is found in Applicants' specification, pg. 6, lines 27-30 and pg. 9, lines 2-3.

Claim 42 has been amended to recite a method of "depositing a dielectric film . . . and subjecting the dielectric film to a wet oxidation with steam process . . . by heating a mixture of hydrogen and oxygen gases . . . at a temperature greater than about 450°C, wherein said mixture is a ratio from 0.1 to approximately 0.80 of hydrogen gas to oxygen gas and said hydrogen and oxygen gases are combined in said rapid thermal process chamber and said rapid thermal process chamber has a pressure of around 1 millitorr." Support is found in Applicants' specification, pg. 9, lines 3-5.

Claim 42 stands rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Claim 42 has been amended to omit claim language reciting that only hydrogen and oxygen are used in the rapid thermal process

chamber. Accordingly, withdrawal of the § 112, first paragraph rejection is respectfully solicited.

Claims 13, 14, 17, and 42 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Miner. The rejection is respectfully traversed.

Miner does not disclose "subjecting the dielectric film to a densifying treatment to stabilize said film by heating the semiconductor substrate . . . and [that] the pressure of said rapid thermal process chamber is held at about atmospheric pressure," as recited in claim 13, or that the "hydrogen and oxygen gases are combined in said rapid thermal process chamber and said rapid thermal process chamber has a pressure of around 1 millitorr," as recited in claim 42.

Miner discloses, in FIG. 7, reactant gas mixtures of O_2 and H_2 at partial pressures of 150 Torr (Col. 8, lines 44-45). FIG. 7 further illustrates that the detonation pressure in the RTP chamber is always less than 0.8 atmosphere. Miner does not teach that the rapid thermal process chamber is held at about atmospheric pressure, i.e., 760 Torr. Further, Miner's FIG. 7 illustrates that the pressure within the RTP chamber fluctuates between 0.8 to 0.3 atmospheres. Further still, Miner does not teach subjecting the dielectric film to a densifying treatment to stabilize said film by heating the semiconductor substrate before a wet oxidation with steam process.

Similarly, Miner does not disclose that when the oxygen and hydrogen gases are combined in the rapid thermal process chamber, the pressure within the rapid thermal process chamber is around one millitorr. Miner's FIG. 7 illustrates in situ steam generation carried out at a pressure greater than 0.3 atmosphere and less than 0.8 atmosphere. Accordingly, the RTP chamber in Miner does not come close to a pressure of 1 millitorr when the hydrogen and oxygen gases are combined in the RTP chamber.

Claims 14 and 17 depend from claim 13 and are allowable along with claim 13 for at least the reasons provided above. Withdrawal of the § 102(e) rejection for claims 13, 14, 17, and 42 is respectfully solicited.

Claims 13, 14, 16, and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Luan in view of Tseng. The rejection is respectfully traversed.

The cited references do not teach or suggest "subjecting the dielectric film to a densifying treatment to stabilize said film by heating the semiconductor substrate . . . and [that] the pressure of said rapid thermal process chamber is held at about atmospheric pressure," as recited in claim 13, or that the "hydrogen and oxygen gases are combined in said rapid thermal process chamber and said rapid thermal process chamber has a pressure of around 1 millitorr," as recited in claim 42.

The Office Action asserts that "Tseng is provided to show ranges of hydrogen to oxygen and other temperatures that may be used to achieve a better tantalum oxide gate dielectric for transistors," and concludes that "provides a suggest [sic] to combine the reference of Tseng with Luan." (Office Action, pg. 8). Applicants respectfully disagree.

There must be some motivation to combine Luan and Tseng together. The mere fact that both references disclose a gate dielectric is not sufficient for purposes of establishing obviousness. In this particular case, Luan and Tseng teach away from each other. Luan merely teaches an oxidation temperature of 600°C (1st page, Experiment paragraph). Tseng teaches an oxidation temperature of 750-950°C, and optimally about 800°C (Col. 5, lines 59-61). Thus, Tseng teaches an oxidation temperature that is at least 150°C greater than the oxidation temperature in Luan. In fact, Luan discloses that they "have developed a very effective low temperature (<800C) RTP" process (First page,

Results and Discussion paragraph). In contrast, Tseng discloses a high-temperature process. There is no motivation to combine the high-temperature parameters disclosed in Tseng with the low-temperature parameters of Luan. The two references teach away from each other's processing parameters by virtue of the difference in temperatures.

Similarly, Luan discloses a maximum oxidation time of 60 seconds (FIG. 1). In contrast, Tseng discloses an oxidation time of about 10 minutes to an hour (Col. 5., lines 62-65). In other words, Tseng's oxidation process is ten times longer than Luan's oxidation process time. Again, the two references teach away from each other by virtue of the differences in oxidation processing time.

Moreover, the Office Action acknowledges that Tseng employs a furnace and Luan employs a rapid thermal process chamber. The oxidation is carried out in two completely different vessels. Applicants respectfully submit that "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." M.P.E.P. § 2143 (emphasis added). Here, there is no such suggestion or motivation.

Applicants are not stating that the two references teach merely different temperatures as the Office Action asserts (pg. 7); but, rather that the cited references teach oxidation processes in completely different vessels, at completely different temperatures, with completely different times. Indeed, the references themselves, because of their disparate processing conditions, teach away from the proposed combination that the Office Action asserts.

Further, Applicants respectfully submit that no evidence of the criticality of the claimed range of 0.1 to 0.8 is required since the Office Action has not set forth a *prima facie* case of obviousness. Applicants' claimed ratio of $H_2:0_2$ is from 0.1 to about

0.8. The Office Action has acknowledged that Luan does not teach or suggest any ratio for hydrogen to oxygen (Office Action, pg. 5).

Tseng is relied upon for disclosing a hydrogen to oxygen ration where "a range of approximately 3% to 9% is expected to obtain comparable results." (Col. 6, lines 60-63) (emphasis added). There is, however, no overlap between Applicants' claimed $H_2:0_2$ ratio range and Tseng's disclosed $H_2:0_2$ ratio range. "In the case where the claimed ranges 'overlap or lie inside ranges disclosed by the prior art' a *prima facie* case of obviousness exists." M.P.E.P. § 2144.05. Accordingly, the Office Action has not set forth a *prima facie* case of obviousness. As such, Applicants do not need to provide evidence of the criticality of the claimed hydrogen to oxygen ratio.

The Office Action further asserts that it would be a matter of routine optimization to determine the optimum ratio of hydrogen to oxygen, since Luan clearly teaches the use of hydrogen and oxygen, therefore expressly indicates some ratio. Applicants respectfully submit that "[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." M.P.E.P. § 2143.03. The cited references do not teach or suggest all of the limitations recited in claim 13. Specifically, Luan and Tseng do not disclose or suggest Applicants' claimed $H_2:0_2$ ratio range of from 0.1 to about 0.8, or that the rapid thermal process chamber is held at about atmospheric pressure.

Claims 14 and 16-17 depend from independent claim 13 and are allowable along with claim 13. Withdrawal of the § 103(a) rejection is solicited.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

By_____

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